

# *United's SKY-PAD<sub>tm</sub> Project*



**FLIGHT  
OPERATIONS  
TECHNOLOGY**  
*Innovations in flight*

*Capt. Joe Burns*

**Director – Flight Operations Technology**

# Overview

- Previous AWIN project
- Current AWIN/EFB Activity - Phase I
- UAL Future "Sky-Pad" activity - Phase 2-4



# ***AWIN Team Members***

- *Honeywell Inc. (Team Lead)*
- *National Center for Atmospheric Research*
- *National Weather Service*
- *The SITA Group*
- *ARINC*
- *WSI*
- *Kavouras*
- *Allied Signal*
- *United Airlines*
- *NASA*



## Products WINN Tested:

- CONUS Radar\*
- Worldwide Satellite\*
- Convection\*
- Nowcasting
- Airports (METARS/TAFS)
- Turbulence Forecast



## *United WINN Enablers:*

- ClassTrax/CrewTrax
- TrainTrax
- PubTrax
- Netlink
- PalmLink



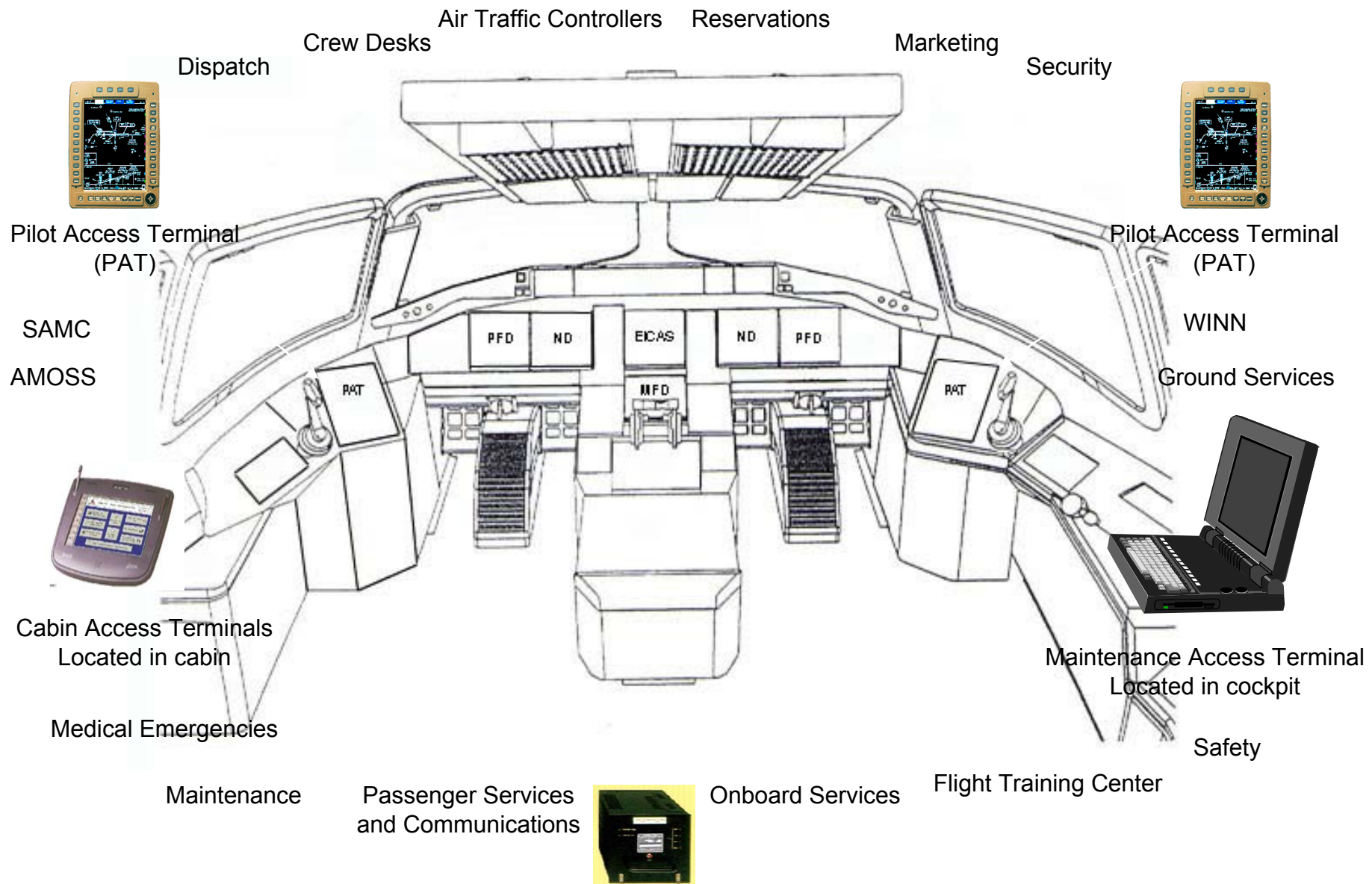
# B-777 PAT Locations



- The First Officer's PAT location is on the right sidewall. The Captain's PAT is located on the opposite sidewall.



# Aircraft Information System

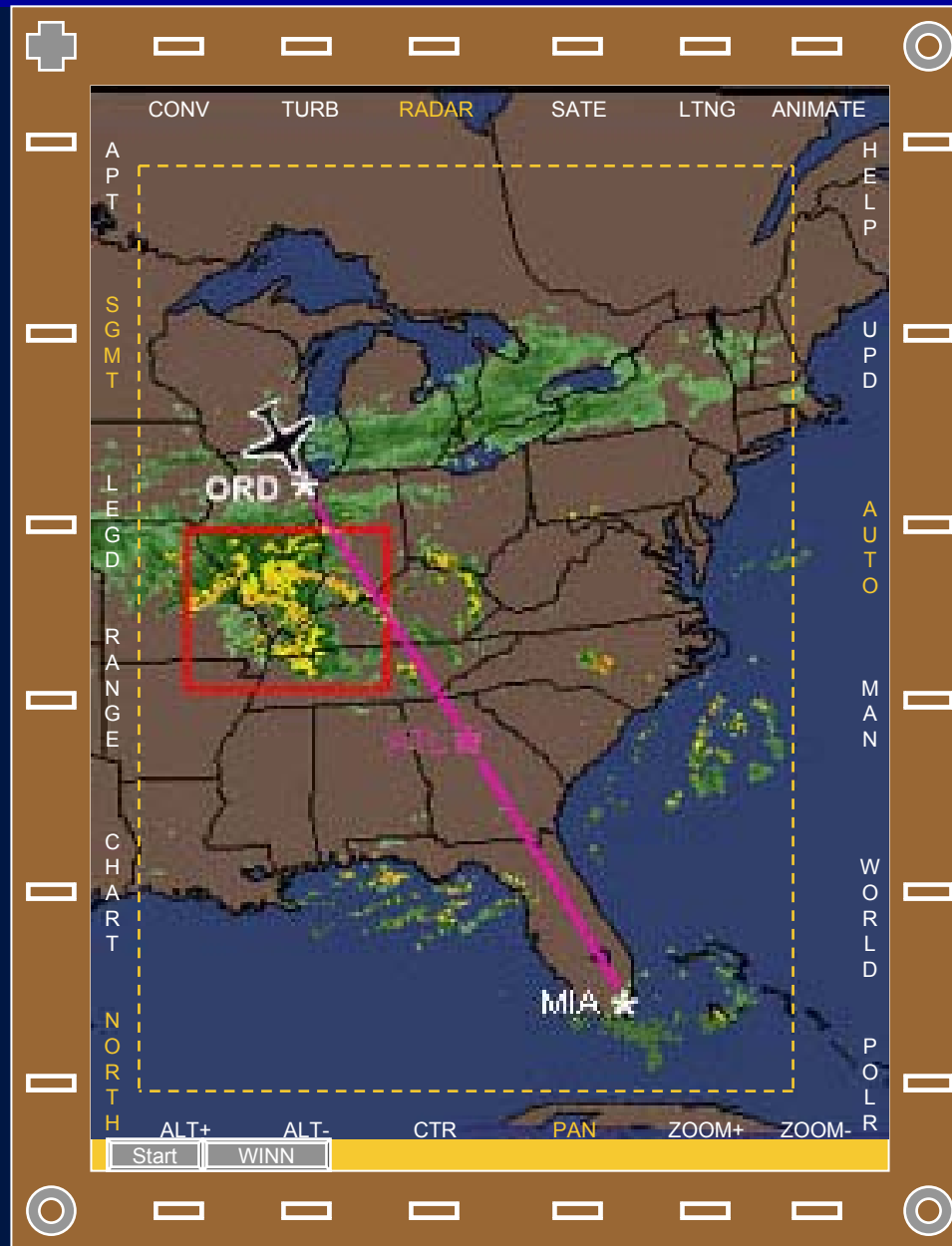


# Weather Information Network (WINN)

SIGMET, METARS, TAF, and airport ATIS information may be displayed in a graphic format and in text

The FMC's flight plan route is automatically displayed

Data is displayed in a "North up" format or in a "Track up" format



Covective, Volcanic Ash, Turbulence, Winds, Icing, Radar (conus only), Satellite, Lightning, and "Nowcasting" weather data are available world wide via automatic data link

Provides quality information for making better decisions

Enhances pilots' situational awareness

The WINN program automatically centers and tracks the aircraft's location or by manually panning to any location

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# Electronic Documents

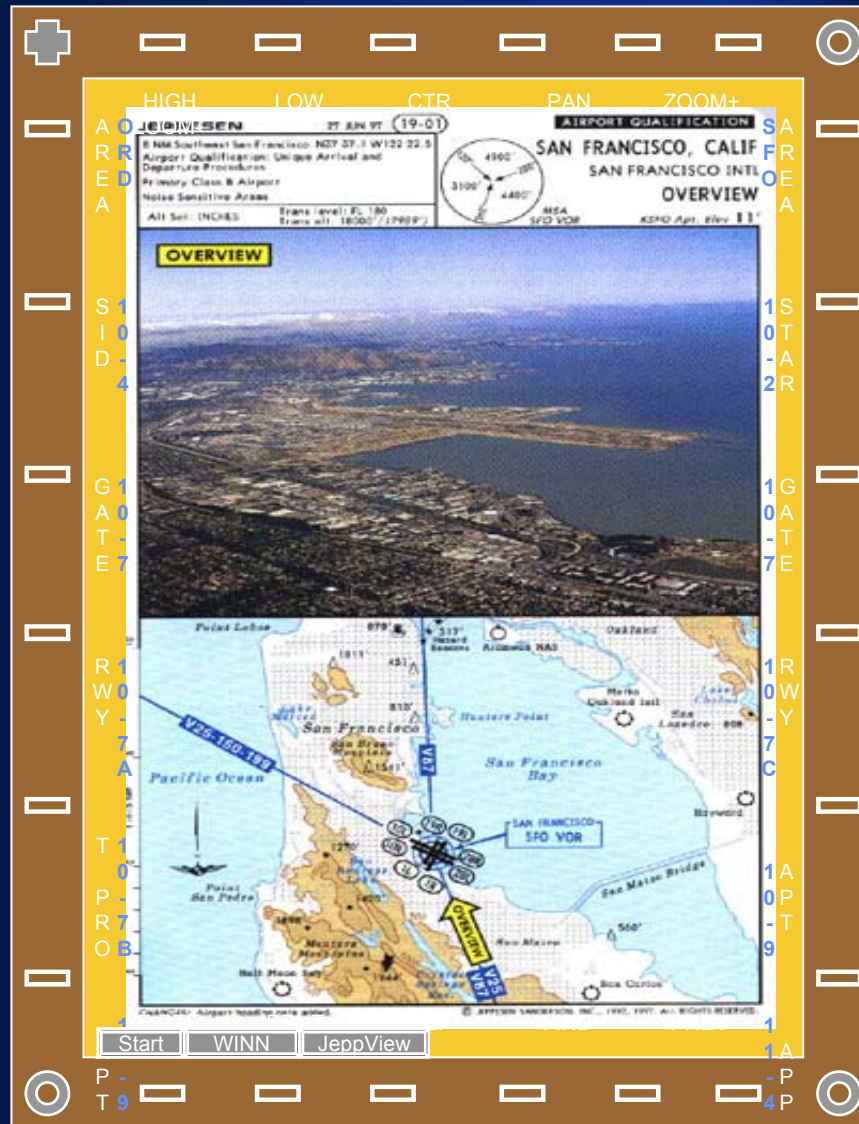
## Jepp View

Origin airport tabs are displayed on the left side of document

The FMC's current flight plan route is displayed on to High, Low, Area, Departure, and Arrival charts

Waypoint functionality on charts is the same as on the Navigation Display

Emergency escape route documents for high terrain areas are available (E RTE)



JeppView interfaces with the FMC to select origin and destination airports' SID, STAR, runway data, emergency engine out procedures ("T Pro"), airport, and approach charts

Aircraft's printer provides copies of selected chart

Find and Help functions provide access to legend and glossary information

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# Current EFB/AWIN Project

- Just finished 40+ segments on A320 in-service evaluation
- 90% mission success rate
- Average of 1-2% per leg gain due to increased wx enhancement!
- Trial Turbulence plot very successful (+5 min. notification in radar style graphics)
- Potential reduction in 40-50% of ACARS traffic



# Current EFB/AWIN Project

- Cooperative agreement helped pay for product development of our system
- Fujitsu Pen Tablet, GPS, GTE Airphone
- Tested products included:
  - WINN-Lite graphical Weather software with NEXRAD, Turbulence, SAT, SIGMETs, TAFs. METARs, etc in GPS Geo-referenced moving map.
  - Full World Jepp plates with moving map ship's position overlay (including airport diagrams)
  - Digital FOM and AFM (from PUBTRAX)



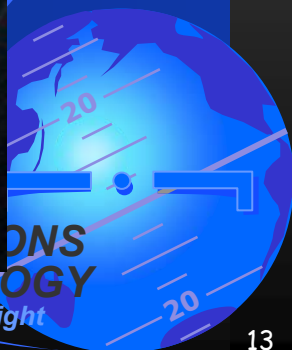
# Current EFB/AWIN Project

- 3.3 lbs vs 48
- At home/hotel Unimatic/Apollo access
- 50/50 Line/TK crews in Test
- First ever Approved use of Internet Protocol to 121 Line service flight deck





# Joe and Dave with AWIN/EFB Unit



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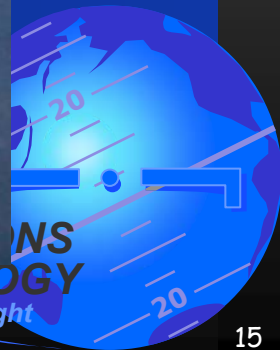
# Graphical Sigmets on WINN Display



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# ***Correlation with Display***



## ***Future “Sky-Pad” activity – Phase II***

- Potential funding from FAA
- Human Factors design in Simulators
- Permanently mounted monitor (same size as Jepp Chart) or Tablet on moveable arm with FMS style keyboard attached to removeable docking station
- L-Band, VDL/2, or Airphone weather receiver, power interface
- All EFB functions, weather, and Moving Map situation display (runway inc
- STCs to be included



# Future “Sky-Pad” activity – Phase II

- 2 Airbus aircraft to be part of FAAs OpEval/3 next May
- Teaming partners include:
  - L-band sat -or- VDL/2 Network -or- GTE
  - Commodity weather, messaging, receiver
  - NASA - funding?, WINN weather software
  - FAA - funding and certification
  - FMS style display vendor
  - UAL - Project management, General Contractor, digitized manuals, charts, hf



# UAL “Sky-Pad” Fleet Deployment – Ph III

- A320/777 in 2002/2003
- All others in 2004-2005
- Includes - all paper docs, aircraft CBT, Weather Graphics, Wireless messaging, Animated Jepps, FMS position overlay, Moving Map, home access to all UAL network systems, home study and training, Bluetooth or RF airport link



## ***Phase IV – Broadband integration***

- 2003-05
- Integrates with broadband server
- Total high speed internet appliance
- 80% of AOC communications
- Customer Resource Management
- Crew Resource Management



# ***Sky-Pad Payback and savings***

- Shipping of charts and printing
- reduced weight
- medical out of service
- reduction in ACARS
- 1-2% reduction in annual fuel burn
- 2% reduction in total block time
- 80% reduction in all turbulence injuries





*Questions?*

